

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Cancelled)

2. (Previously Amended) The machine cell of claim 31, further including an upper gate for holding the second sheet material, said upper gate movable between a raised position away from said lower nest and an engaged position near said lower nest with said lateral access to said material-contacting area being maintained.

3. (Previously Amended) The machine cell of claim 31, wherein said vacuum system further includes a plenum and at least one fluid line connecting said plenum to said elongated channel.

4. (Original) The machine cell of claim 3, wherein said vacuum system further includes a fluid line for fluidly connecting said plenum to a vacuum source.

5. (Previously Amended) The machine cell of claim 31, wherein said lower nest further includes an alignment mechanism for aligning the upper sheet material to the lower sheet material.

6. (Previously Amended) The machine cell of claim 5, wherein said alignment mechanism further comprises a pair of crowders, each of said pair of crowders including a pivoting alignment finger.

7. (Original) The machine cell of claim 2, further including means for moving said upper gate relative to said lower nest.

8. (Original) The machine cell of claim 2, wherein said upper gate includes at least one contact support shaft.

9. (Original) The machine cell of claim 2, wherein said upper gate includes three spaced-apart contact support shafts.

10. (Original) The machine cell of claim 8, wherein said at least one contact support shaft includes a contact plunger for contacting the second sheet material.

11. (Original) The machine cell of claim 10, wherein said contact plunger includes a spring-loaded nose.

12. (Previously Amended) The machine cell of claim 8, wherein said at least one contact plunger support shaft includes an alignment pin capable of engaging an alignment hole formed in the second sheet material.

Claims 13-21 are cancelled

22. (Previously Amended) The machine cell of claim 45, wherein said elongated cavity is disposed within said frame.

23. (Previously Amended) The machine cell of claim 45, further including at least one alignment mechanism fitted to said frame.

24. (Previously Amended) The machine cell of claim 45, further including a central support disposed within said elongated cavity.

25. (Previously Amended) The machine cell of claim 45, wherein said elongated cavity is an elongated channel.

26. (Previously Amended) The machine cell of claim 45, wherein said frame further comprises a second material contacting surface elevated from said first material contacting surface relative to said base.

27. (Previously Amended) The machine cell of claim 45, further including a forming tool, said forming tool being operative to effect forming of at least one of the first sheet material or the second sheet material.

Claims 28-30 are cancelled

31. (Currently Amended) A machine cell for the forming and joining of a first sheet material to a second sheet material, the first sheet material having a surface contour, the machine cell comprising:

- a lower nest including a frame and an upper surface having a material-contacting area defined to substantially conform to a perimeter region of the first sheet material, said material-contacting area being laterally accessible;
- a vacuum pad supported by said frame adjacent to a portion of said material contacting portion, said vacuum pad having a sealing surface defined to substantially conform to an interior region of the first sheet material and an elongated channel formed therein;
- a vacuum system to enable fluid communication between a vacuum source and said elongated channel for generating a vacuum and a downward clamping force sufficient to immobilized the first sheet material when subjected to a lateral force imparted during the forming of a hemming operation performed on the first sheet material.

32. (Previously Presented) The machine cell of claim 31 wherein said vacuum pad further comprising a support member disposed within said elongated channel and having a sealing surface defined to substantially conform to an interior region of the first sheet material

33. (Currently Amended) A machine cell for the forming and joining of a first sheet material to a second sheet material, the first sheet material having a surface contour, the machine cell comprising:

a lower nest including a frame and an upper surface having a material-contacting area defined to substantially conform to a perimeter region of the first sheet material, said material-contacting area being laterally accessible;

a plurality of pads supported by said frame, each of said plurality of pads located adjacent to a portion of said material-contacting portion and having a sealing surface defined to substantially conform to an interior region of the first sheet material and an elongated channel formed therein;

a vacuum system to enable fluid communication between a vacuum source and said elongated channels formed in each of said plurality of pads for generating a vacuum and a downward clamping force sufficient to immobilized the first sheet material when subjected to a lateral force imparted during the forming of a hemming operation performed on the first sheet material.

34. (Previously Presented) The machine cell of claim 33 further including an upper gate for holding the second sheet material, said upper gate movable between a raised position away from said lower nest and an engaged position near said lower nest with said lateral access to said material-contacting area being maintained.

35. (Previously Presented) The machine cell of claim 34, further including means for moving said upper gate relative to said lower nest.

36. (Previously Presented) The machine cell of claim 34, wherein said upper gate includes at least one contact support shaft.

37. (Previously Presented) The machine cell of claim 34, wherein said upper gate includes three spaced-apart contact support shafts.

38. (Previously Presented) The machine cell of claim 37, wherein at least one of said three spaced-apart contact support shafts includes a contact plunger for contacting the second sheet material.

39. (Previously Presented) The machine cell of claim 38, wherein said contact plunger comprises a housing slidably supporting a spring-loaded nose.

40. (Previously Presented) The machine cell of claim 38, wherein at least one of said three spaced-apart contact support shafts includes an alignment pin capable of engaging an alignment hole formed in the second sheet material.

41. (Previously Presented) The machine cell of claim 33, wherein said vacuum system further comprises a plenum and a fluid line connecting said plenum to each of said elongated channels.

42. (Previously Presented) The machine cell of claim 41, wherein said vacuum system further comprises a vacuum source in fluid communication with said plenum.

43. (Previously Presented) The machine cell of claim 33, wherein said lower nest further includes an alignment mechanism for aligning the upper sheet material to the lower sheet material.

44. (Previously Presented) The machine cell of claim 43, wherein said alignment mechanism comprises a pair of crowders, each of said pair of crowders including a pivoting alignment finger.

45. (Previously Presented) A machine cell for the forming and joining of a first sheet material to a second sheet material, the first sheet material having a surface contour, the machine cell comprising:

a lower nest including a frame having a base and a plurality of sidewalls, each of said plurality of sidewalls extending from said base and terminating at an upper surface having a material-contacting area defined to substantially conform to a perimeter region of the first sheet material, said material-contacting area being laterally accessible;

a plurality of pads supported on said base and located adjacent to said plurality of sidewalls, each of said plurality of pads having a sealing surface defined to substantially conform to an interior region of the first sheet material and an elongated cavity formed therein;

a vacuum system to enable fluid communication between a vacuum source and each of said elongated cavities formed in each of said plurality of pads for generating a vacuum sufficient to immobilized the first sheet material during the joining of the first sheet material to the second sheet material, said vacuum system including a vacuum source and a fluid line coupling said vacuum source to each of said elongated cavities.

46. (Previously Presented) A method for forming and joining of a first sheet material to a second sheet material, the method comprising:

providing a lower nest having a frame and a pad;

locating a first sheet material on said frame such that a perimeter region on a first side of said first sheet material is supported on a material-contacting area of said frame and an interior region of said first side engages said pad such that a sealed elongated channel is formed between said pad and said first sheet material adjacent a portion of said material-contacting area;

locating the second sheet material on a second side of said first sheet material opposite said first side;

evacuating said sealed elongated channel to immobilizing said first sheet material on said frame; and

operating a tool on said first sheet material to form a flange over an edge of said second sheet material.

47. (Previously Presented) The method of claim 46 further comprising aligning said first sheet material on said frame prior to evacuating said sealed elongated channel.

48. (Previously Presented) The method of claim 46 further comprising aligning said second sheet material on said first sheet material prior to evacuating operating said tool.